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Original Article

Evaluation of Therapeutic Decision for Treatment of Carious Lesions by Dental Students

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Abstract

Objective: To evaluate the therapeutic decision making for the academic of the last year of dentistry at the universities of the Distrito Federal, on dental caries in deciduous teeth and permanent young. **Material and Methods:** The evaluation was obtained through the application of a questionnaire containing a diagram representing five different stages of deep carious lesions on interproximal radiographs. Were selected through census of students enrolled last semester of each institution and concluded that the theoretical discipline of pediatric dentistry in accordance with the curriculum offered by the University. Data were analyzed statistically by the chi-square test the 5% level of significance. **Results:** We analyzed 132 questionnaires of which 30.3% of respondents opted for immediate restorative treatment for the injuries to deciduous teeth in the dentin-enamel junction to the permanent tooth, the percentage rose to 31.1%, revealing that there was similarity between universities about which strategy to use. Regarding caries removal there was a discrepancy in an institution compared the other in choosing the more invasive treatment ($p = 0.0014$). **Conclusion:** We see the need to implement teaching strategies for the training of a professional within the philosophy of minimum intervention.

Keywords: Dental caries; Students; Dental, diagnosis.

Introduction

For many years, Black's classification of caries lesions has guided clinical restorative treatment, which has consisted of the total removal of carious tissue extending to areas susceptible to caries progression [1]. Treating sequelae was considered disease treatment. Scientific knowledge about the etiopathology of caries was insufficient for caries control; therefore, it was believed that the whole lesion was necessarily progressive, requiring treatment according to the principle of "extension for prevention" [2].

The understanding of dental caries as a disease resulting from disequilibrium between the de- and re-mineralization processes has prompted a new paradigm for modern dentistry [3] one which emphasizes the promotion of oral health.

In this context, the concept of minimal intervention (MI) dentistry has arisen, which promotes less invasive interventions and a more conservative approach to the dental structures and patient. This approach has a positive psychological value, especially for children [4,5].

Emphases in MI dentistry include maximal conservation of the enamel and dentine, tracking the depth and progression of carious lesions, assessing the risk of caries, and, especially, making an early diagnosis. However, the complexity of the process of detecting lesions has increased as a higher prevalence of carious lesions are being detected in their initial stages [6].

The progression and diagnosis of caries lesions are widely debated topics in dentistry [7]. The partial removal of carious tissue in symptomless teeth, whether deciduous or permanent, has been shown to reduce the risk of exposing the pulp, and it does not cause side effects for the patient [8]. Total removal of the carious tissue from the cavity floor is not needed, so long as it is completely sealed [9,10,11].

However, many dentists still practice the classic approach, removing all infected and affected dentine [12]. This fact may be related to the tendency of dental surgeons to maintain the same patterns of decision-making as they practiced during their undergraduate programs [13].

Although many studies have targeted the idiosyncrasies of the dental decision-making process, most of these studies have been performed on already trained professionals [14]. Considering the important role of minimal intervention dentistry, studies should be designed to assess the level of knowledge of dental students [15].

In this context, the proposed research is relevant because it can highlight the importance of the education of students in the characterization of the future professional process and evaluate the student's perception about the philosophy of Minimum Intervention Dentistry adopted by universities.

Material and Methods

A cross-sectional study was developed with undergraduates in their last semester of dentistry at four universities in Brasília, Brazil: University of Brasilia (UNB), Catholic University of Brasilia (UCB), Integrated College of Central Plateau Educational Union (Faciplac) and University

Paulista (UNIP). Were selected students for the study by a census approach. All evaluations took place at the respective institutions of higher learning. Participants were selected after they had signed an informed consent form. The Ethics Committee on Research with Human Subjects at the Catholic University of Brasília (CEP. 099/10) analyzed and approved the research.

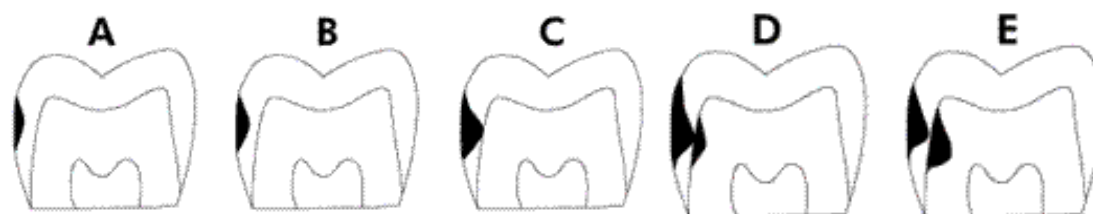


Figure 1. Diagram of the stages of an interproximal x-ray image of a 6-year-old patient/ ceod=1 and a 15-year-old patient/ CPOD=1. A Lesion involving the enamel's external third; B Lesion involving two-thirds of the enamel; C Lesion up to the dental-enamel junction (DEJ); D Lesion involving the external third of the dentine; E Lesion involving two-thirds of the dentine.

The student was asked to indicate at what level they would perform a restorative treatment in deciduous and permanent dentitions, and whether they would opt for partial or total removal of the carious tissue. We evaluated the influence of the restorative material on the removal of carious tissue and the selection of restorative material (adhesive or nonadhesive) for deciduous and permanent teeth.

After data collection, we obtained descriptive statistics of the variables analyzed. To evaluate the responses from the different universities, we performed the chi-square test, with a 5% significance level. The null hypothesis was that there was no difference in the responses from students at different universities.

Results

The four universities participating in the study had a total of 140 students in their final semester. Some students refused to participate in the study, and others could not be reached. Finally, we obtained and analyzed 132 completed questionnaires from 132 students (67% women; mean age, 23.9 years) responded (94.28%), since 5 students refused to participate in the study (3.57%) and 3 could not be reached (2.14%).

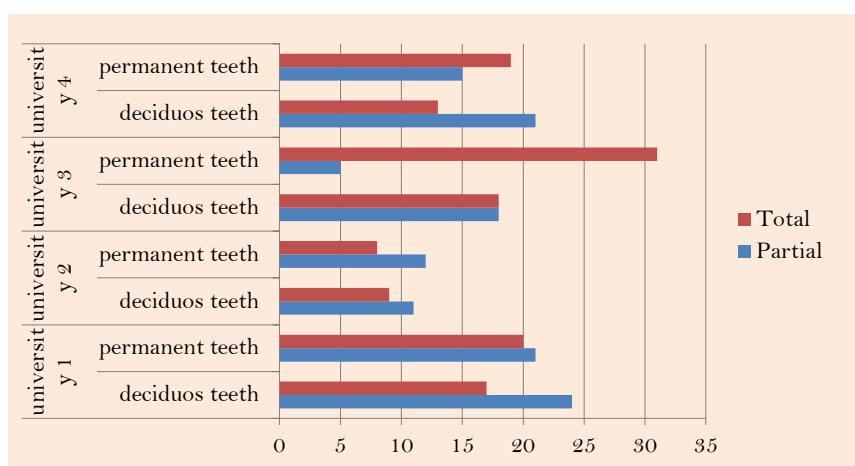
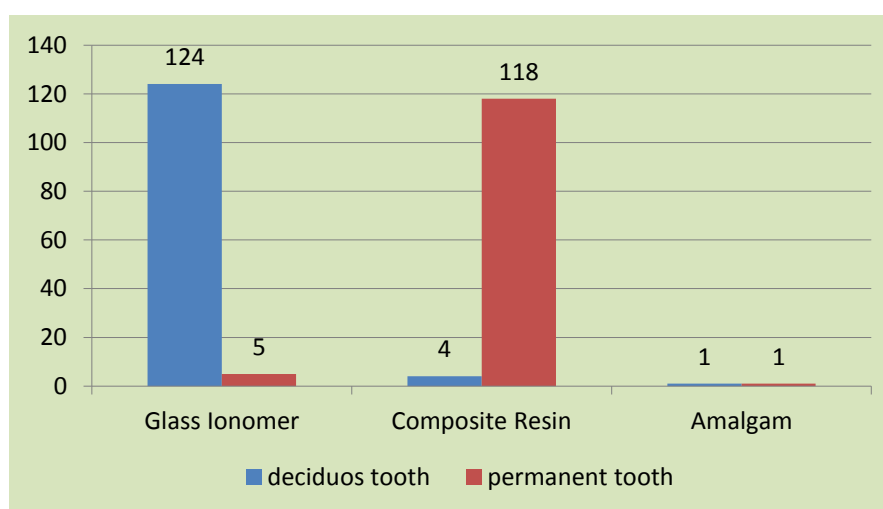
Table 1 shows the results for the analysis of the teeth presented on the diagram in relation to immediate restorative treatment for the deciduous and permanent teeth.

Figure 2 shows the patterns for removing carious tissue from the deciduous and permanent teeth for each university.

Most students (84.1%) indicated that the restorative material influenced whether carious tissue should be partially or totally removed, whereas 15.2% indicated that the restorative material did not influence how carious tissue should be removed, and 0.8% of students did not answer the question. Figure 3 shows the type of restorative material selected for deciduous and permanent teeth.

Table 1. Absolute frequency and percentage of responses from students at four universities, with respect to immediate restorative treatment for deciduous and permanent teeth.

Responses	University 1		University 2		University 3		University 4	
	deciduous teeth	permanent teeth	deciduous teeth	permanent teeth	deciduous teeth	permanent teeth	deciduous teeth	permanent teeth
(A) external third of the enamel	3 (7,3%)	3 (7,3%)	0 (0%)	0 (0%)	2 (5,6%)	7 (19,4%)	1 (2,9%)	2 (5,7%)
(B) 2/3 of the enamel	1 (2,4%)	4 (9,8%)	0 (0%)	1 (5%)	5 (13,9%)	1 (2,8%)	3 (8,6%)	6 (17,1%)
(C) up to the DEJ	14 (34,1%)	12 (29,3%)	7 (35%)	7 (35%)	10 (27,8%)	13 (36,1%)	9 (25,7%)	9 (25,7%)
(D) external third of the dentine	7 (17,1%)	9 (22%)	5 (25%)	7 (35%)	8 (22,2%)	8 (22,2%)	12 (34,3%)	11 (31,4%)
(E) internal half of the dentine	15 (36,6%)	12 (29,3%)	7 (35%)	4 (20%)	9 (25%)	4 (11,1%)	9 (25,7%)	7 (20%)
More than One	1 (2,4%)	1 (2,4%)	1 (5%)	1 (5%)	2 (5,6%)	3 (8,3%)	1 (2,9%)	0 (0%)
Sample total	41 (100%)	41 (100%)	20 (100%)	20 (100%)	36 (100%)	36 (100%)	35 (100%)	35 (100%)

**Figure 2. Distribution of the sample according to university and the method chosen for removing carious tissue from deciduous and permanent teeth.****Figure 3. Distribution of the sample according to the type of restorative material chosen and the tooth type.**

In terms of the instruments used to remove the carious tissue, 62.1% chose the use of drills and manual instruments, 34.8% chose only manual instruments, 2.3% chose only drills, and 0.8% chose other, no specified methods.

Discussion

Most dental students in this study expressed doubts about the decision to use immediate restorative treatment, and opted for intervention in lesions up to the dental-enamel junction (DEJ) for both dentitions. Researchers have recently established directives in cariology that require undergraduates to have a basic knowledge and ability to evaluate the need for invasive versus non-invasive treatment in clinical decision-making. This approach involves the concept of MI dentistry [18]. Considering the whole radiolucency to have a cavity increases the chances of false positives because lesions without cavitation can be or become paralyzed [19,20]. In a population with low caries levels, this approach to restorative treatment means there is considerable overtreatment. Moreover, the presence of radiolucency in the external enamel does not always correspond to cavitation [21,22]. For example, in one study, 64.16% of the 53 surfaces evaluated were not cavitated [23]. In another report, only 19.3% of surfaces were cavitated when the image showing radiolucency in the external enamel was near the DEJ [24]. A third study of radiolucency in the enamel of deciduous teeth found that 95% of the surfaces did not have cavitation [25].

In this study, students at one university showed a discrepancy from the other universities concerning the total removal of carious tissue from permanent teeth ($p = 0.00014$). This finding reinforces the idea that some students continue to follow the basic principle that has regulated operative dentistry for centuries: namely, the removal of all tissue affected by a carious lesion, without considering its extent or depth [26-28]. Complete removal of carious dentine is not considered a prerequisite for halting lesion progression [29]. Even without excavation of the carious tissue, the lesion progression can be halted in certain circumstances [30].

In this study, 84.1% of participants stated that the type of restorative material involved would influence the technique used to remove carious tissue. We believe that this finding stems from the fact that nonadhesive materials, like amalgam, require cavitary preparations to enable handling of the restorative material in the cavity. The concept of cavitary preparations valorizes the resistance of the restorative material and not the healthy dental structure [31]. With the development of adhesive restorative techniques, the restorative treatment is restricted to the removal of the carious tissue, without the need to create additional retentions or to confer a predefined geometric configuration for preparing cavities in order to improve the material's performance [32]. Thus, the adhesive materials have an essentially biological aim, permitting a less invasive approach in carious lesions by eroding fewer parts of the dental substrate, as well as limiting bacterial penetration by sealing the edges of the restoration [33].

In terms of the material of choice to restore the cavity, we found a preference for glass ionomer cement for deciduous teeth. This material has a very important role in clinical pediatric

dentistry, with its main indication stemming from the material's adhesiveness to the dental structure, coefficient of linear thermal expansion similar to the tooth's, biocompatibility, and liberation of fluoride [34,35]. Because pediatric patients are less able to control caries, the liberated fluoride has the ability to remineralize the dental structure and stop the caries process [36].

For permanent teeth, composite resin was the material of choice. Composite resins are typically used in direct dental restorations of the front and back teeth [37]. The color of composite resins is similar to that of the original tooth. Therefore, use of these resins can maintain the smile aesthetics. This dental material is increasingly [38]. A large portion (62.1%) of students indicated they would use manual instruments together with drills to remove carious lesions [39]. Similarly, other studies have reported that the use of steel drill bits at low speed was the most common method for removing carious tissue. Better alternatives [40,41]. are available, especially for the partial removal of carious dentine; however, such alternatives are generally ignored in favor of manual cutting instruments, which give the professional more ability to control their handling [42].

One limitation of this study was to have been held in dentistry courses of only one region of Brazil, Federal District. Thus, the results can not be generalized to the entire population. However, despite this limitation, it is evident the need to create a complete curriculum in the area of Cariology, seeking to provide teaching guidelines. This need also suggested and recommended by the European Organization for Caries Research in 2011 [43].

Conclusion

A significant proportion of undergraduates in their final year of dentistry at universities in Brazil indicated that they would use immediate restorative treatment for lesions restricted to the enamel in deciduous and permanent dentitions. Given the results, there is a clear need to implement teaching strategies to train professionals in the philosophy of MI.

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